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ABSTRACT

Literature on mastery learning (ML) is reviewed from the perspectives of past efforts, current approaches, and future directions. To date, approaches in managing the ML literature have been in four major areas: (1) the "typing" of ML efforts in the context of a comprehensive literature review; (2) the compilation of state-of-the-art bibliographies of ML; (3) the synthesis of empirical ML studies through meta-analysis; and (4) interrelating the concepts and variables common to ML, effective schools, and outcome-based schooling via a macro-model. The current problem appears to be one of bringing more organization, control, and accessibility to the vast collection of ML literature. Future directions are discussed in the following areas: more investigation of learner-oriented and instruction-oriented variables considered to be alterable; greater interest in why ML succeeds; more interplay between ML and instructional psychology; an improved framework and new taxonomy for interpreting documents; more emphasis on aspects of ML related to other disciplines; and interrelating ML and other school reform movements. A table presents a new taxonomy for literature analysis. A 29-item list of references is included. (SLD)

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Harnessing the Mastery Learning Literature: Past Efforts, Current Status, & Future Directions

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Abstract

This paper considers the unusually vast range of the mastery learning literature from the perspectives of past efforts, current status, and future directions oriented toward harnessing in an optimal way the potential of this body of knowledge for the advancement of learning. Attention is given to such seemingly divergent issues as research questions, bibliographic efforts, meta-analytic studies, interrelating school reform efforts, ATI research, intervening variables, instructional psychology, "latent" or hidden literature sources, and a taxonomy for literature trend analyses.

Harnessing the Mastery Learning Literature:

Past Efforts, Current Status, & Future Directions

As a student and proponent of mastery learning since the early 1970s, I have occasionally wondered what the likes of Carleton Washburne and Henry C. Morrison would have thought of the phenomenal expansion of interest in this approach to learning and instruction that we have witnessed just since the seminal publications of Carroll (1963) and Bloom (1968) during the 1960s. I would assume that those early 20th-century advocates of high achievement as a constant, time as a variable, diagnostic testing and learning correctives/enrichment as the delivery mechanisms, and individual-based (Washburne, 1922) or group-based instruction (Morrison, 1926) as the organizational format would probably be astonished and delighted over what their pioneering efforts had wrought--and rightfully so!

Yet, is it not at least remotely possible that those of us involved in the mastery learning movement over the past 25 years have been so privileged by its rapid expansion that we have failed to recognize and appreciate fully the richness that exists in its vast literature as well as the incredible potential that still remains unexplored but quite promising? Such, in my judgment, is indeed the case. Accordingly, what I attempt to do in this brief paper is reflect on the theme of harnessing both the actual and potential power inherent

in the mastery learning literature with a specific view to what has already transpired, what is currently our status, and what future directions might be most promising to explore.

Past Efforts

In retrospect, it seems to me that the principal thrust thus far where managing the mastery learning literature is concerned has been in four major areas: (a) the "typing" of mastery learning efforts in the context of a comprehensive literature review; (b) the compilation of a state-of-the-art bibliography in mastery learning; (c) the synthesis of empirical mastery learning studies via meta-analytic techniques; and (d) the interrelating of concepts and variables common to mastery learning, effective schools, and outcome-based schooling via a so-called macromodel.

With respect to the first focus, the Block and Burns (1976) entry in Review of Research in Education provided not only the first comprehensive literature review spanning both LFM and PSI versions of mastery learning, but also--and perhaps more importantly--suggested a "typing" of mastery learning efforts based on a taxonomy of research questions. Essentially, this taxonomy addresses the following four categories:

1. Type I mastery learning research (MLR) represents the earliest kind and focuses on the question "Does it work?"

2. Type II MLR represents a logical sequel to the aforementioned in that it begins to look beyond the immediate

cognitive effects of mastery learning strategies on students and to focus on the question "If it works, then what might follow?" The expanded focus here is on such areas as affective consequences; time considerations; learning-to-learn effects; and teacher-role, administrative, curricular, sociological, and economic implications.

Type III MLR addresses the following two kinds of studies and related research questions: (a) student-entry characteristic studies that focus on the question "Do mastery strategies have the same effects on different kinds of students, i.e., students with different kinds of cognitive and affective entry characteristics?" and (b) component studies that ask "Do some components of mastery strategies have greater effects on students than other components?"

Type IV MLR attempts to translate findings about why mastery strategies work into statements of how they can be implemented and, hence, focuses on the question "How does it work?"

Regarding the second focus, during the early 1980s I established on an admittedly limited scale a Clearinghouse on Mastery Learning based at Loyola University of New Orleans (Hymel, 1981a, 1981b, 1982a). One of several objectives of this national repository for mastery learning documents was to compile for dissemination a state-of-the-art bibliography on mastery learning (Hymel, 1982b). This effort resulted in

the identification of approximately 1,000 citations from the mastery learning literature. Follow-up attempts to upgrade the bibliography saw the listing expand to about 1,500 citations, but with the withdrawal of internal support the subsequent publication of an updated bibliography has yet to materialize. The Mastery Learning Clearinghouse, however, has continued to collect and house in reprint, photocopy, microfiche, and microfilm form mastery learning documents as well as audio- and video-mediated materials.

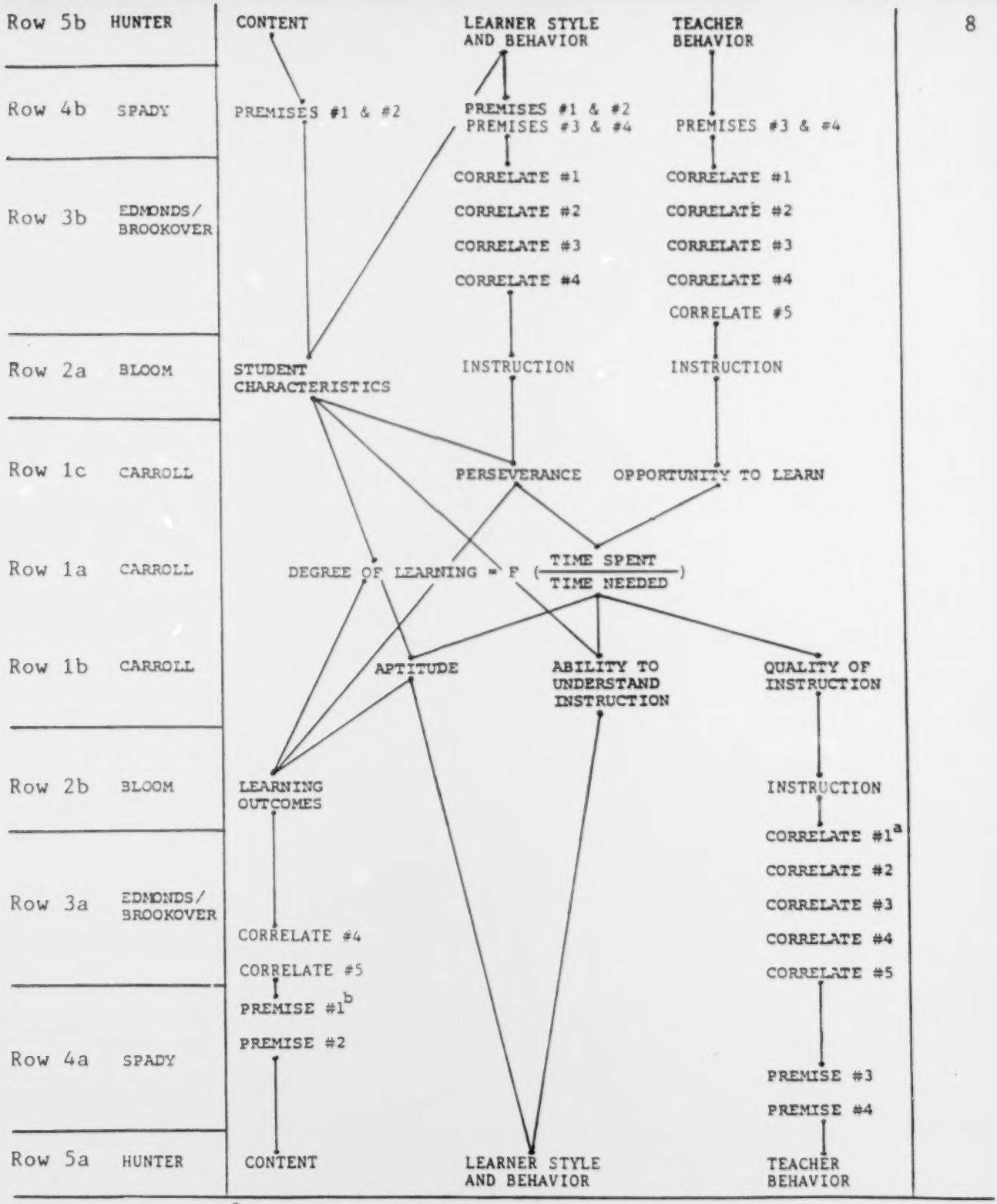
The third focus thus far where managing the mastery learning literature is concerned involves the synthesis of empirical mastery learning studies via meta-analytic techniques. The initial effort of this kind was the Kulik, Kulik, and Cohen (1979) study that provided an empirical synthesis of individually-based, student-paced approaches to mastery, i.e., the Personalized System of Instruction (PSI) strategy. In 1986, Guskey and Gates synthesized meta-analytically elementary and secondary school-based studies that fell in the group-based, teacher-paced approach to mastery, i.e., the Learning for Mastery (LFM) strategy. Expanding on this 1986 effort, Guskey and Pigott (1988) then examined meta-analytically a larger collection of group-based studies that encompassed the tertiary level of education as well.

The fourth attempt at making more manageable the expansive mastery learning literature currently available

is that of a proposed macromodel of effective, outcome-based, mastery learning school variables that I have tried to refine over the past four years (Hymel, 1986, 1988). (See Figure 1.) It seems to me that although proponents of effective, outcome-based, mastery schooling efforts have occasionally acknowledged some linkages among these three movements (e.g.: Block, Efthim, & Burns, 1988; Brookover et al., 1982; Brookover, Block, & Spady, 1984; Spady, 1982), the precise nature and extent of their interdependence have gone relatively unaddressed in a comprehensive fashion. The macromodel attempts to portray schematically two basic notions: (a) a core of variables rooted in Carroll's (1963) model of school learning that is foundational to promoting effective, outcome-based, mastery schools and (b) a network of relationships among those variables most generic to advancing school reform grounded in the three previously-mentioned movements. I am inclined to think that such a broad-based macromodel reflecting those variables most basic to school reform could serve to consolidate what on the surface may seem to be divergent literature trends but what in reality are integral components of a "grand mosaic."

Current Status

My own assessment of the current state of affairs regarding the mastery learning literature conjures up an image of a vast power source teeming with potential yet only



[a]Correlate #1: Instructional Leadership & Quality
Correlate #2: Instructional Focus
Correlate #3: School Climate
Correlate #4: Teacher Expectations & Behaviors
Correlate #5: Program Evaluation Via Standardized Measures

[b]Premise #1: Capability of Students To Excel
Premise #2: Success/Self-Concept/Learning Linkage
Premise #3: Alterable Instruction So As To Improve Learning
Premise #4: Strategies To Maximize Learning Conditions

Figure 1. A macromodel of effective, outcome-based, mastery learning school variables

partially harnessed with respect to its energy being channelled in appropriately diversified and needed directions. The quantity of documents is certainly not in question, nor is the quality of much of the mastery learning literature, particularly when one considers the relatively small cadre of mastery learning proponents who year after year continue the dialogue at an encouragingly high level. If the problem is not one of quantity nor quality, what then is the proverbial "fly in the ointment" where my uneasiness is concerned? Essentially, I believe I am troubled by the sense that the literature in this most exciting approach to learning and instruction is indeed impressive as far as it goes, but does it really go far enough? Let me try to operationalize this quaint cliche somewhat more directly in the form of several observations/questions about the mastery learning literature I find particularly bothersome:

1. In my estimation the taxonomy of mastery learning research questions proposed by Block and Burns in 1976 represented (and still does!) an excellent framework in which to base a consideration of what has transpired and to project an agenda for future directions. However, with the exception of the Type I ("Does it work?") and the Type II ("If it works, then what might follow?") focal points, what significant progress have we really made where the other two types of mastery learning efforts are concerned?

As covered earlier in this paper, the Type III mastery learning research (MLR) concerns itself with (a) student-entry characteristic studies that focus on the question "Do mastery strategies have the same effects on different kinds of students with varying cognitive and affective entry characteristics?" and (b) component studies that ask "Do some components of mastery strategies have greater effects on students than others?" Seven years ago at an AERA annual meeting in Montreal I reacted to the excitement of this type of mastery learning research in the following way:

> Due to its implied focus on the interactions between learner-oriented and instruction-oriented variables considered alterable in nature, it would seem that the Type III genre of MLR encompasses the greatest potential for researchers and practitioners interested in exploring and advancing the conceptual and functional dimensions of mastery learning and, thereby, contributing to the science of teaching . . . . A catalyst for the advent of Type III MLR has been the relatively recent recognition of and increasing attention devoted to . . . instructional psychology . . . . However, the full potential of Type III MLR and its intrinsic reliance on the broad scope of instructional psychology have yet to be recognized fully. (Hymel, 1983, pp. 9-10)

Unfortunately, in 1990 I must again echo the same contention that the full potential of Type III MLR and its foundational reliance on instructional psychology have yet to be appropriately acknowledged and explored.

With respect to the alleged Type IV MLR attempt to translate findings about why mastery strategies work into statements of how they can be implemented, in all candor I am still awaiting a clarification of the why issue. Unless I have seriously missed some major works in the field, I still have the impression that the preponderance of the mastery learning research has examined almost exclusively the issue of what the relationships are between independent and dependent variables and have not adequately addressed the more crucial consideration of why we are finding what we are finding between independent and dependent variables. Translated, why is it that the category of intervening or explanatory variables in mastery learning research has been virtually ignored?

2. Even with the availability of a fairly comprehensive bibliography on mastery learning that approaches 1,000 citations (Hymel, 1982b)--and which obviously now begs for a long-overdue expansion and reprinting--the mastery learning literature strikes me as being not nearly as well documented in preliminary sources and accessible to researchers and practitioners as it should and could be. Consequently, I tend to think in terms of so-called "manifest content" and "latent content" (my apologies

to Freud) where mastery learning sources are concerned. The "manifest" category of the mastery learning literature is to be found quite easily in standard preliminary sources such as ERIC's Resources in Education and Current Index to Journals in Education as well as Psychological Abstracts. However, what about those "latent" or seemingly hidden sources that go undetected except when a form of serendipity comes to the rescue? For example, standard manual and computer searches of the above-cited preliminary sources would typically not uncover very readily specific and important mastery learning entries in such works as the following: Buss and Poley's (1976) Individual Differences: Traits and Factors; Eisner's (1971) Confronting Curriculum Reform; Glaser's (1962) Training Research and Education; Gronlund's (1974) Individualizing Classroom Instruction; Husen and Postlethwaite's (1983) International Encyclopedia of Education: Research and Studies; Johnston's (1975) Behavior Research and Technology in Higher Education; Krumboltz's (1965) Learning and the Educational Process; Mitzel's (1982) Encyclopedia of Educational Research; and Treffinger, Davis, and Ripple's (1977) Handbook on Educational Psychology.

The current problem, then, is one of bringing under a more extensive degree of organization, control, and accessibility the vast collection of mastery learning documents that at times seems quite unmanageable and/or hidden.

3. Other than the Type I - Type IV MLR categories already discussed, the current status of the mastery learning literature appears to be about completely void of a comprehensive taxonomy or classification scheme for directing state-of-the-art literature reviews that are thematic rather than empirical in nature. Exemplary precedents have already been established via the empirically-based meta-analyses conducted by Kulik et al. (1979), Guskey and Gates (1986), and Guskey and Pigott (1988). What is still missing, though, are exhaustive reviews of literature trends in mastery learning that reflect such themes as the following: (a) mastery learning literature genre, i.e., literature types considered theoretical, functional, measurement, or research; (b) contributing/foundational disciplines undergirding mastery learning, i.e., contributions from psychology, sociology, philosophy, history, and anthropology; (c) interaction of educational specialties and educational levels, i.e., the crossing of the four major areas of educational specializations--namely, instruction, curriculum, counseling/guidance, and administration--with the three major educational levels--namely, elementary, secondary, and tertiary schooling; (d) interaction of curricular-area focus and educational level, i.e., the crossing of several levels of subject-area/professional field focus with the major educational levels; (e) specificity/breadth of application, i.e., applications of mastery learning ranging from macro to intermediate to micro levels, e.g., from entire school system-based

to instructional program-based to instructional unit-based; and (f) geographical location.

Future Directions

As one might anticipate, the three areas discussed above regarding the current status of the mastery learning literature do indeed suggest possible future directions that impress me as the logical sequels to where the literature has brought us thus far. Those future directions, then, are as follows:

1. The empirical side of mastery learning seems to be in need of considerably more Type III research. This would entail studies that employ ATI designs, thereby allowing for more extensive and elaborate investigations of learner-oriented and instruction-oriented variables considered alterable in nature.

2. The research dimension of mastery learning would also do well to incorporate in its repertoire of variables investigated that of the intervening variable. Would not greater insight into why mastery learning succeeds perhaps put us in an even better position to implement strategies that ensure greater quality and equity of learning across all students?

3. The ATI and intervening variable themes just mentioned coincide quite well with the need for additional future interplay between mastery learning per se and various areas in instructional psychology. For example, the extensive

literature bases in instructional design, learning styles, and models of teaching would seem to invite a closer exploration where mastery learning theory and practice are concerned.

4. The "latent" or hidden content problem in the mastery learning literature as well as the paucity of thematic literature trend reviews in mastery learning would seem to suggest a rather dire need for some sort of organizational framework for helping us better interpret the abundance of available documents as well as the "gaps" that exist in the mastery learning literature. In a paper presented to the Southwestern Psychological Association three years ago (Hymel, 1987),I suggested just such a taxonomy that accommodates the six themes hinted at earlier. (See Table 1: Taxonomy for Literature Trend Analyses in Mastery Learning.)

5. In the context of the taxonomy for literature trend analyses, perhaps Axes II, IV, and VI call out most emphatically where future directions in the mastery learning literature are needed.

Specifically, Axis II--Contributing/Foundational Disciplines--would suggest considerably more emphasis in the literature on those aspects of mastery learning that have their bases in the disciplines of psychology, sociology, philosophy, history, and anthropology. Admittedly, psychology and sociology do have their share of coverage in the mastery learning literature;

Table 1

Taxonomy for Literature Trend Analyses in Mastery Learning

Axis I: Literature Genre

A. Theoretical/Conceptual

B. Functional

C. Measurement

D. Research

Axis II: Contributing/Foundational Disciplines

A. Psychology

B. Sociology

C. Philosophy

D. History

E. Anthropology

Axis III: Interaction of Educational Specialty and Educational Level

Educational specialty	Educational level			
	Elementary	Secondary	Tertiary	Generic
Instruction				
Curriculum				
Counseling/ guidance				
Administration				

(table continues)

Axis IV: Interaction of Curricular-Area Focus and Educational Level

Curricular-area focus	Educational level: Elementary	Secondary	Tertiary	Generic
Mathematics				
Basic sciences				
Language arts				
Social studies				
Foreign languages				
Computer science				
Health & physical education				
Home economics				
Vocational-technical education				
Performing arts				
Health sciences				
Behavioral sciences				

(table continues)

	Educational level			
Curricular-area focus	Elementary	Secondary	Tertiary	Generic
Engineering sciences				
Military science				
Business & industry				
Law				
Law enforcement				
Teacher preparation				

Axis V: Specificity/Breadth of Application

A. Macro level

1. School system-based

2. Individual school-based

B. Intermediate level

1. Instructional program-based

2. Individual course-based

C. Micro level

1. Instructional unit-based

2. Learning task-based

Axis VI: Geographical Location

A. North American-based focus

B. Internationally-based focus

however, even in those disciplines I suspect we have only started to unravel their role in the support of mastery learning theory and practice. Where philosophy, history, and anthropology are concerned, however, the mastery learning literature is virtually silent. Philosophical views of reality, truth, and values must be related to the concerns of mastery learning from the perspectives of both researchers and practitioners alike; to do otherwise would be to ignore the potential contributions of the most foundational of all academic disciplines. Historical antecedents to our 20th-century versions of mastery learning are, of course, essential to placing in proper perspective where we actually are now and how we arrived at this particular juncture. Cultural anthropology, particularly, may indeed add something to our thinking about mastery learning as we venture beyond the comfort (and, perhaps, constraints) of our own familiar settings to embrace a more pluralistic view of humankind's diversities and commonalities.

Axis IV--Interaction of Curricular-Area Focus and Educational Level--is by design quite encompassing. Since the literature is comparatively replete with elementary/secondary emphases in standard academic subjects, a future direction may very well entail more attention at the tertiary level in such areas as the health sciences, business and industry, law and law enforcement, and military science.

Axis VI--Geographical Location--would suggest a needed expansion in the literature beyond the myopic focus on the North American experience with mastery learning to embrace a more international scope and sensitivity.

6. Perhaps still another "future direction" for the mastery learning literature that in actuality is already in motion is that of the interrelating of what may very well be the three most viable school reform movements; namely, the mastery learning, effective schools, and outcome-based schooling efforts. As evidence of this literature emphasis on interrelating reform movements that are considerably more similar than dissimiliar, one need only consider the increased dialogue among representatives of these schools of thought in print and at professional conferences.

Summary

Past efforts that are particularly germane to harnessing the vast potential for good inherent in the mastery learning literature have spanned such areas as (a) the identification of four major research question orientations in the context of a comprehensive literature review, (b) the compilation of a state-of-the-art bibliography in mastery learning, (c) three meta-analytic reviews synthesizing appropriate mastery learning studies, and (d) the specification of a macromodel for interrelating those principal variables found in the mastery learning, effective schools, and outcome-based schooling movements. The current status of the literature in this most exciting approach to learning and instruction is considered quite impressive as

far as it goes; however, concerns have been raised regarding whether or not original agendas have indeed been met and/or extended far enough to ensure the proper advancement of learning. Future directions for not only actualizing but also advancing the mastery learning literature have been suggested, with particular attention given to such themes as ATI research, intervening variables, instructional psychology, a taxonomy for literature trend analyses, and the interrelating of major school reform movements.

References

Block, J. H., & Burns, R. B. (1976). Mastery learning. In L. S. Shulman (Ed.), Review of research in education (4th ed., pp. 3-49). Itasca, IL: F. E. Peacock, Inc.

Block, J. H., Efthim, H. E., & Burns, R. B. (1988). Building effective mastery learning schools. White Plains, NY: Longman.

Bloom, B. S. (1968). Learning for mastery. Evaluation Comment, 1(2), /Unpaginated/

Brookover, W. B., Block, J. H., & Spady, W. G. (1984, April). Effective schools, mastery learning, and outcome-based schooling: A dialogue on the similarities and distinctions. Invited panel discussion conducted at the annual meeting of the American Educational Research Association, New Orleans.

Brookover, W. B., Beamer, L., Efthim, H., Hathaway, D., Lezotte, L., Miller, S., Passalacqua, J., & Tornatzky, L. (1983). Creating effective schools: An inservice program for enhancing school learning climate and achievement. Homes Beach, FL: Learning Publications, Inc.

Buss, A. R., & Poley, W. (1976). Individual differences: Traits and factors. New York: Gardner Press, Onc.

Carroll, J. B. (1963). A model of school learning. Teachers College Record, 64, 723-733.

Eisner, E. W. (Ed.). (1971). Confronting curriculum reform. Boston: Little, Brown.

Glaser, R. (Ed.). (1962). Training research and education. Pittsburgh: University of Pittsburgh Press.

Gronlund, N. E. (1974). Individualizing classroom instruction. New York: The Macmillan Co.

Guskey, T. R., & Gates, S. L. (1986). Synthesis of research on the effects of mastery learning in elementary and secondary classrooms. Educational Leadership, 43, 73-80.

Guskey, T. R., & Pigott, T. D. (1988). Research on group-based mastery learning programs: A meta-analysis. The Journal of Educational Research, 81(4), 197-216.

Husen, T., & Postlethwaite, T. N. (Eds.). (1983). International encyclopedia of education: Research and studies. Oxford: Pergamon Press.

Hymel, G. M. (1981a, April). Establishing a clearinghouse on mastery learning: Meager beginnings but promising prospects. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles. (ERIC Document Reproduction Service No. ED 205 172).

Hymel, G. M. (1981b). Establishing a clearinghouse on mastery learning. Outcomes, 1(1), 6-8.

Hymel, G. M. (1982a, March). Managing the proliferation of the mastery learning literature: A progress report on the Loyola Clearinghouse on Mastery Learning. Paper presented at the annual meeting of the American Educational Research Association, New York City. (ERIC Document Reproduction Service No. ED 221 194)

Hymel, G. M. (1982b). Mastery learning: A comprehensive bibliography (2nd ed.). New Orleans: Clearinghouse on Mastery Learning, Loyola University.

Hymel, G. M. (1983, April). Contributions of mastery learning to the science of teaching. Paper presented at the annual meeting of the American Educational Research Association, Montreal. (ERIC Document Reproduction Service No. ED 237 541).

Hymel, G. M. (1986). A macro model for mastery learning, effective schools, and outcome-based schooling: An overview. Outcomes, 5(3), 31-36.

Hymel, G. M. (1987, April). A recommended taxonomy for literature trend analyses in mastery learning. Paper presented at the annual meeting of the Southwestern Psychological Association, New Orleans.

Hymel, G. M. (1988, April). A macromodel of effective, outcomes-based, mastery learning school variables: An expanded view. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Johnston, J. M. (Ed.). (1975). Behavior research and technology in higher education. Springfield, IL: Charles C. Thomas.

Krumboltz, J. D. (Ed.). (1965). Learning and the educational process. Chicago: Rand McNally

Kulik, J. A., Kulik, C. C., & Cohen, P. A. (1979). A meta-anlaysis of outcome studies of Keller's personalized system of instruction. American Psychologist, 34, 307-318.

Mitzel, H. E. (Ed.). (1982). Encyclopedia of educational research (5th ed., Vol. 2). New York: The Pree Press.

Morrison, H. C. (1926). The practice of teaching in the secondary school. Chicago: University of Chicago Press.

Spady, W. G. (1982). Outcome-based instructional management: A sociological perspective. The Australian Journal of Education, 26(2), 123-143.

Treffinger, D. J., Davis, J. K., & Ripple, R. E. (Eds.). (1977). Handbook of educational psychology. New York: Academic Press.

Washburne, C. W. (1922). Educational measurements as a key to individualizing instruction and promotions. Journal of Educational Research, 5, 195-206.